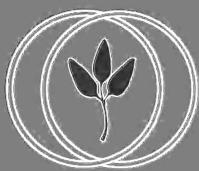


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ANPC National Office

GPO Box 1777
Canberra, ACT 2601, Australia
T (02) 6250 9509
E anpc@anpc.asn.au
W www.anpc.asn.au

ANPC Staff

Chantelle Doyle, Christine Fernance,
Jo Lynch

ANPC Volunteers

Robert Hawes

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New Zealand Plant Conservation Network

President Sarah Beadel
Secretary Rewi Elliot
PO Box 2199, Wellington, New Zealand
E info@nzpcn.org.nz
W www.nzpcn.org.nz

Australasian Plant Conservation

Editor
Nathan Emery

Associate Editors
Christine Fernance

Editorial Team

Jo Lynch, Tony Auld, Leonie Monks and
Kelli Gowland

Layout & Graphic Design

Siobhan Duffy

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Front cover: OzFish volunteers with
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Plant Germplasm Conservation in Australia.

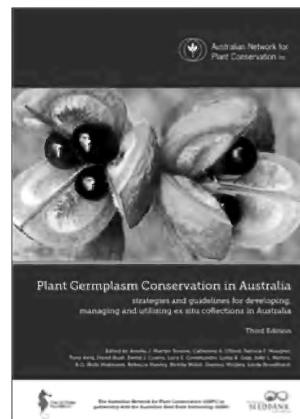
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From the editor

NATHAN EMERY

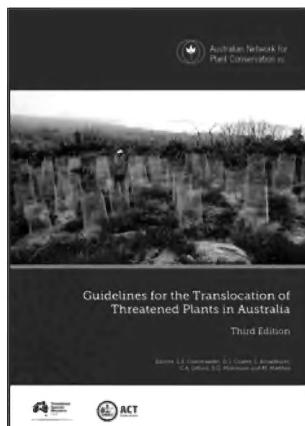
Summer came and went in what seemed like a blink of an eye. Here on the east coast of Australia where I am based, we saw the end of La Niña and a return to warmer and drier conditions, allowing us to get stuck into fieldwork.

We begin this issue with an article by Tessa Kum *et al.* who provide an overview of the recently launched Climate Assessment Tool. Through the case study provided, the authors demonstrate and discuss the application of this tool for assessing the 'climate readiness' of botanic garden sites. The next article by Philip Warburton *et al.* provides key observational results from an investigation into the pollination biology of the Vulnerable East Lynne Midge Orchid. In particular, the authors highlight the possible role of chloropid flies as key pollinators of this species. The third and final article takes a dive into the fascinating world, and terrific work of, restoring Australia's seagrass meadows. Black provides an overview of the importance of Australia's seagrass meadows and shares the success stories that have been driven by community and volunteer groups.

We then have our regular features and notably the return of 'Research Roundup' thanks to Ruby Paroissien who kindly volunteered to take over this feature.

In news from the Australian Seed Bank Partnership, Bradley Bianco *et al.* share some positive outcomes following the fire that greatly impacted Kangaroo Island in 2019-20. Notably, the authors list the key post-fire seed collections of fire ephemeral species and share the positive outcomes of the recently established Kangaroo Island Rare Plant Garden.

Also featuring in this section are a member profile, book review and ANPC news.



Guidelines for the Translocation of Threatened Plants in Australia – 3rd Edition

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Targeting effective plant conservation using the Climate Assessment Tool

TESSA KUM^{1,4*}, DAVE KENDAL^{1,2}, PETER SYMES^{1,3} AND CLARE HART^{1,4}

¹ Climate Change Alliance of Botanic Gardens, VIC

² Future in Nature, TAS & VIC

³ Cooktown Botanic Gardens, QLD

⁴ Royal Botanic Gardens Victoria Melbourne Garden, VIC

* Email: ClimateChangeAlliance@rbg.vic.gov.au

Introduction

Botanic gardens play a unique and vital role in plant conservation. As well as contributing to the holdings of herbariums and seed banks, they host *ex situ* living collections of diverse species, many rare and threatened in the wild. In the case of exceptional species whose seeds cannot be stored via traditional seed banking means, growing specimens in botanic gardens is one of very few conservation options available.

The threats to plant biodiversity posed by the climate crisis are various and amplified by the fact that plants are generally sessile. Many species are unable to keep pace with the rate of climate change by shifting altitude or latitude. An increase in local extinction level events is anticipated – heat waves, severe fires, and floods. Further, pest species that are flourishing in warming conditions, and those with ranges also shifting add to biodiversity threats.

The need for effective *ex situ* conservation will increase with these amplified pressures. Conservation actions in botanic gardens need to consider future climates to ensure ongoing success. It is not enough to conserve only that which is threatened now and nearby. This is particularly true for trees, whose long lives often see them outliving those who plant them and are the species most likely to experience this unknown future.

The Climate Assessment Tool (CAT) – recently launched by the Climate Change Alliance of Botanic Gardens (CCABG) at the 7th Global Botanic Gardens Congress – is a free, easily accessible tool. It allows users to establish the parameters of the future climate of their location according to global emission scenarios laid out by the UN's IPCC Working Groups, and assess the suitability of any tree taxa to those conditions. The prime factor used to determine suitability is Mean Annual Temperature (MAT). While MAT is not considered an actual mechanism causing plant stress, decline or death, research has found that it is a robust proxy for a variety of other environmental factors that influence species distribution (Kendal *et al.* 2012). Annual precipitation was not used as it is highly variable and easily mitigated by nursery propagation and irrigation in the landscape. However,

estimates of a range of precipitation and temperature variables are provided in the CAT to aid decision-making.

Climate change will likely see the onset of temperatures that our local landscapes have never experienced, and planning for 'never before' is a daunting prospect. The CAT removes some of the ambiguity from this and allows for plant conservation in botanic gardens to be informed with predictive modelling. This also enables horticulturists and other land managers to think and design in future terms.

Case study

As a case study, we will look at Royal Botanic Garden Victoria Melbourne Gardens' Oak collection. Historically, this collection focused on the oaks of temperate climates, and features multiple specimens well over a century in age. It is important to note that these trees have already experienced significant climate change within their lifetimes; both from global warming and the intense urbanisation of their surrounds.

Consider the 160-year-old *Quercus* aff. *alba*, having recently and dramatically collapsed in 2019. Although its demise is difficult to definitively attribute to climate change, its succession had to consider future climates.

The CAT indicates that Melbourne's historic climate, with a MAT of 15°C, was at the warmer end of *Q. aff alba*'s known occurrences (Figure 1).

The GBIF datasets indicate natural distribution, while the UrbanPlants and PlantSearch datasets indicate specimens grown in cultivation.

The CAT uses two emission scenarios from the IPCC (2022):

- 2050 – a scenario which assumes steps have been taken to curb global emissions.
- 2090 – a 'business as usual' scenario which assumes little has been done to curb global emissions.

In the predicted 'business as usual' climate for 2090, Melbourne's MAT of 19°C is very near the upper limit of known occurrences; while *Q. aff alba* may still grow in these conditions, there is little evidence to support this being a climate suitable for it to flourish (Figure 2).

Climate Assessment Tool

[How To Use](#)

Assessment Results

for taxon *Quercus alba* L.

at garden Royal Botanic Gardens, Victoria - Melbourne Gardens (Australia)

with climate change scenario [Current conditions](#)

Source	Records	MAT	Temperature in Celsius												Updated At	Hottest Month	Coldest Quarter	Annual Precipitation	Driest Quarter					
			7°	8°	9°	10°	11°	12°	13°	14°	15°	16°	17°	18°	19°	20°	21°	22°	23°					
GBIF BGCI	2675	11.2 °C	2	2	3	3	3	3	3	2	2	1	1	1	1	1	0	0	0	2019-06-13	29.4 °C	-0.2 °C	1092 mm/year	234 mm/qtr
GBIF Current	7547	11 °C	2	2	3	3	3	3	3	2	2	1	1	1	1	1	0	0	0	2020-10-09	29.2 °C	-0.2 °C	1115 mm/year	241 mm/qtr
Model	0	11.2 °C	1	2	2	3	3	3	3	2	1	1	2	0	0	0	0	0	0	2021-06-18			0	0
UrbanPlants	53	10.8 °C	1	2	2	3	3	3	3	3	2	2	2	1	1	1	1	1	0	2020-06-30	29.5 °C	0.5 °C	968 mm/year	185 mm/qtr
PlantSearch	186	10.7 °C	2	2	3	3	3	3	3	2	2	1	1	1	1	1	0	0	0	2023-01-02	28.9 °C	0.6 °C	976 mm/year	181 mm/qtr

Projected climate details at garden based on selected climate scenario:

Mean Annual Temperature (BIO1): **15.1 °C**

Maximum temperature of the hottest month (BIO5): **26.1 °C**

Minimum temperature of the coldest quarter (BIO11): **10.4 °C**

Annual precipitation (BIO12): **654 mm/year**

Precipitation of the driest quarter (BIO17): **142 mm/qtr**

Risk Codes

- 0 Species not known to occur at this temperature
- 1 At the edge of the known temperature for the species
- 2 Species known to occur at this temperature
- 3 Species mostly occurs at this temperature

Figure 1. Climate Assessment Tool results for *Quercus alba* at RGV Melbourne Gardens, for the current climate.

Climate Assessment Tool

[How To Use](#)

Assessment Results

for taxon *Quercus alba* L.

at garden Royal Botanic Gardens, Victoria - Melbourne Gardens (Australia)

with climate change scenario [Business as Usual in 2090 \(SSP3\)](#)

Source	Records	MAT	Temperature in Celsius												Updated At	Hottest Month	Coldest Quarter	Annual Precipitation	Driest Quarter					
			11°	12°	13°	14°	15°	16°	17°	18°	19°	20°	21°	22°	23°	24°	25°	26°	27°					
GBIF BGCI	2675	11.2 °C	3	3	3	2	2	1	1	1	1	1	0	0	0	0	0	0	0	2019-06-13	29.4 °C	-0.2 °C	1092 mm/year	234 mm/qtr
GBIF Current	7547	11 °C	3	3	3	2	2	1	1	1	1	1	1	0	0	0	0	0	0	2020-10-09	29.2 °C	-0.2 °C	1115 mm/year	241 mm/qtr
Model	0	11.2 °C	3	3	3	2	1	1	1	1	0	0	0	0	0	0	0	0	0	2021-06-18			0	0
UrbanPlants	53	10.8 °C	3	3	3	3	2	2	2	2	1	1	1	1	0	0	0	0	0	2020-06-30	29.5 °C	0.5 °C	968 mm/year	185 mm/qtr
PlantSearch	186	10.7 °C	3	3	3	2	2	2	1	1	1	0	0	0	0	0	0	0	0	2023-01-02	28.9 °C	0.6 °C	976 mm/year	181 mm/qtr

Projected climate details at garden based on selected climate scenario:

Mean Annual Temperature (BIO1): **19 °C**

Maximum temperature of the hottest month (BIO5): **31.6 °C**

Minimum temperature of the coldest quarter (BIO11): **13.5 °C**

Annual precipitation (BIO12): **605 mm/year**

Precipitation of the driest quarter (BIO17): **131 mm/qtr**

Risk Codes

- 0 Species not known to occur at this temperature
- 1 At the edge of the known temperature for the species
- 2 Species known to occur at this temperature
- 3 Species mostly occurs at this temperature

Figure 2. Climate Assessment Tool results for *Quercus alba* for Melbourne Gardens in 2090 assuming no steps have been taken to curb global emissions.

As oaks are exceptional species, *ex situ* living collections are vital to oak conservation. For Melbourne Gardens' Oak Collection to continue such vital conservation work, the focus needs to shift toward those oak species more suited to warmer and drier climates.

Early 2022 saw the successful importation of *Quercus engelmannii* acorns from Los Angeles Arboretum to Melbourne Gardens, via a seed exchange collaboration with San Diego Botanic Garden (Figure 3).

Q. engelmannii derives from an ancient lineage of oaks which grow from northern Mexico to southern California, USA, and is Endangered (IUCN Red List) due to habitat loss and poor recruitment (Beckman 2017).

The CAT indicates that the current climate is on the verge of becoming unsuitable at Los Angeles Arboretum; a proxy for its natural distribution. *Q. engelmannii* is well known at the current MAT of 18°C, but that swiftly changes as the MAT rises (Figure 4).

The story is quite different when looking at Melbourne's current climate. The CAT indicates that Melbourne is warming up and moving into *Q. engelmannii*'s known temperature band (Figure 5).



Figure 3. Acorns of *Q. engelmannii* successfully imported from the Los Angeles Arboretum, USA, to RBGV Melbourne Gardens, Australia. Photo: RBGV

Climate Assessment Tool ⓘ How To Use

Assessment Results

for taxon *Quercus engelmannii* Greene
 at garden Los Angeles County Arboretum and Botanic Garden (United States of America)
 with climate change scenario Current conditions

Source	Records	MAT	Temperature in Celsius															Updated At	Hottest Month	Coldest Quarter	Annual Precipitation	Driest Quarter
			10°	11°	12°	13°	14°	15°	16°	17°	18° ⓘ	19°	20°	21°	22°	23°	24°					
GBIF BGCI ⓘ	921	17.2 °C	0	0	0	1	1	2	3	3	3	1	0	0	0	0	0	2019-06-13	32.5 °C	12 °C	417 mm/year	9 mm/qtr
GBIF Current ⓘ	650	16.9 °C	0	0	0	1	2	2	3	3	2	0	0	0	0	0	0	2020-10-09	32.6 °C	11.4 °C	408 mm/year	10 mm/qtr
Model ⓘ	0	17.2 °C	0	1	1	1	2	2	3	3	3	3	2	1	1	1	0	2021-06-18			0	0
UrbanPlants ⓘ	3	18.1 °C	0	0	0	0	1	2	3	3	3	2	0	0	0	0	0	2020-06-30	31.3 °C	13.2 °C	766 mm/year	13 mm/qtr
PlantSearch ⓘ	21	16.5 °C	0	1	1	2	2	3	3	3	3	1	1	1	0	0	0	2023-01-03	29.3 °C	11.9 °C	475 mm/year	7 mm/qtr

Projected climate details at garden based on selected climate scenario:

Mean Annual Temperature (BIO1): 18.5 °C
 Maximum temperature of the hottest month (BIO5): 32.5 °C
 Minimum temperature of the coldest quarter (BIO11): 13.5 °C
 Annual precipitation (BIO12): 443 mm/year
 Precipitation of the driest quarter (BIO17): 6 mm/qtr

Risk Codes

- 0 Species not known to occur at this temperature
- 1 At the edge of the known temperature for the species
- 2 Species known to occur at this temperature
- 3 Species mostly occurs at this temperature

Figure 4. Climate Assessment Tool for *Quercus engelmannii* for Los Angeles Arboretum in the current climate.

Assessment Results

for taxon *Quercus engelmannii* Greene

at garden Royal Botanic Gardens, Victoria - Melbourne Gardens (Australia)

with climate change scenario [Current conditions](#)

Source	Records	MAT	Temperature in Celsius												Updated At	Hottest Month	Coldest Quarter	Annual Precipitation	Driest Quarter					
			7°	8°	9°	10°	11°	12°	13°	14°	15°	16°	17°	18°	19°	20°	21°	22°	23°					
GBIF BGCI	921	17.2 °C	0	0	0	0	0	0	1	1	2	3	3	3	1	0	0	0	0	2019-06-13	32.5 °C	12 °C	417 mm/year	9 mm/qtr
GBIF Current	650	16.9 °C	0	0	0	0	0	0	1	2	2	3	3	2	0	0	0	0	0	2020-10-09	32.6 °C	11.4 °C	408 mm/year	10 mm/qtr
Model	0	17.2 °C	0	0	0	0	1	1	1	2	2	3	3	3	3	2	1	1	1	2021-06-18			0	0
UrbanPlants	3	18.1 °C	0	0	0	0	0	0	0	1	2	3	3	3	2	0	0	0	0	2020-06-30	31.3 °C	13.2 °C	766 mm/year	13 mm/qtr
PlantSearch	21	16.5 °C	0	0	0	0	1	1	2	2	3	3	3	3	1	1	1	0	0	2023-01-03	29.3 °C	11.9 °C	475 mm/year	7 mm/qtr

Projected climate details at garden based on selected climate scenario:

Mean Annual Temperature (BIO1): 15.1 °C

Maximum temperature of the hottest month (BIO5): 26.1 °C

Minimum temperature of the coldest quarter (BIO11): 10.4 °C

Annual precipitation (BIO12): 654 mm/year

Precipitation of the driest quarter (BIO17): 142 mm/qtr

Risk Codes

0	Species not known to occur at this temperature
1	At the edge of the known temperature for the species
2	Species known to occur at this temperature
3	Species mostly occurs at this temperature

Figure 5. Climate Assessment Tool results for *Quercus engelmannii* in Melbourne's current climate.

It must be noted that the information provided by the CAT is not a complete answer to species selection, nor does it replace the need to understand the particulars of your site – soil type and hydrology, local weather extremes, seasonal patterns, etc – or the specific traits of the species in question. How these factors interact will always be subjective to the particular context of your site, climate, and the taxon you are considering. The lowest scores in the CAT do not mean that a species won't grow in a particular climate, and for that matter, the more suitable scores do not guarantee that it will – but the odds are more likely in your favour.

While establishing, *Q. engelmannii* may need coddling from frosts and heatwaves, but when mature it is likely that Melbourne's climate will be eminently suitable, and this oak will thrive.

Conclusion

This is but one example of the way in which the CAT can be applied. Further applications include assessing current tree inventory to identify species that may be at risk in future climates, allowing pre-emptive support and maintenance. The CAT could also be used to identify those species that may require the distribution of plant material to other sites with more suitable climates. The ability to assess trees using climates determined from GPS coordinates also provides insight into future climate

parameters of natural habitats and, therefore, which plants require urgent conservation priority as climate change proceeds.

Acknowledgements

The CAT was developed by the Climate Change Alliance of Botanic Gardens, in partnership with RBGV, Botanic Gardens Conservation International, the University of Tasmania, and with seeding funds from the International Association of Botanic Gardens. For more information and access to the CAT itself, please visit: <http://cat.bgci.org>

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The spider and the fly: post-fire predation of potential pollinator of the threatened East Lynne Midge Orchid (*Corunastylis vernalis*)

PHILIP WARBURTON, DYLAN MORRISSEY AND PATRICIA KAYE

Eurobodalla Regional Botanic Garden, Batemans Bay, NSW
Email: herbarium@erbg.org.au

Introduction

The East Lynne Midge Orchid (*Corunastylis vernalis*) is a small perennial ground orchid found only in a narrow belt of dry sclerophyll forest on the New South Wales (NSW) South Coast between Moruya and Ulladulla. Classified as Vulnerable, most known populations occur in national park estate or in state forest. Although the entire range of *C. vernalis* was burnt in the summer 2019-20 bushfires, populations that are monitored as part of the NSW Government's Saving Our Species program survived the fire impacts and are considered stable (G. Wright pers. comm., 2023).

C. vernalis flowers in spring from early November to mid-December, contrary to most midge orchids which flower in summer or autumn. As with other midge orchids, plants spend most of the year as a dormant tuber, with a single leaf and enclosed flowering stem arising in spring. The species reproduces solely from seed and grows in small populations scattered across suitable habitat in its range.

First described in 2001 from a type specimen collected in 1995, the earliest known record of this species is a herbarium specimen collected in 1986 at the Eurobodalla Regional Botanic Garden (ERBG), near Batemans Bay, NSW. The ERBG site is typical for this species which favours sparse groundcover and low fertility soil and is often seen on disturbed ground along bush tracks (Figure 1). The site was completely burnt in the summer 2019-20 bushfires, all vegetation has regenerated since then. The upper storey is dominated by *Corymbia gummifera* and *Eucalyptus* spp., understorey species include *Acacia terminalis*, *Gompholobium latifolium*, *Daviesia ulicifolia*, and *Podolobium ilicifolium*.

Pollination biology and methods

While the pollination biology of *C. vernalis* is not known, most midge orchids are thought to be pollinated by chloropid flies, although some are self-pollinating, and some are thought to pursue both strategies.

In 2021, very small flies were noticed on flowers at the ERBG site, consistent with the general understanding that chloropid flies pollinate *Corunastylis* species.

Images also indicated the presence of accumulated viscous fluid inside the flower. The open flower structure, the sighting of small flies and presence of viscous fluid suggest that the East Lynne Midge Orchid offers a nectar reward to pollinators, as found for several other species of *Corunastylis* (Bower *et al.* 2015; Ren *et al.* 2020; Towle *et al* 2022).

This work sought to identify potential pollinators and collect preliminary data on reproductive success of populations within the ERBG. Observations were taken on two small populations at the ERBG (Populations A & B) in November-December 2022. Plants were counted for herbivory, flowering and fruiting. Photographic observations were used to record pollinator activity on selected plants.

A third larger population (population C) of approximately 30 individuals was located after observations commenced. Photographic records of selected plants were taken of this population.



Figure 1. *C. vernalis* – ERBG site is typical habitat with low fertility soil along bush tracks. Photo: Patricia Kaye

Results

Reproductive success

The following preliminary observations are derived from very small populations and were collected to inform future study. Approximately 42% of plants flowered and more than half of these produced fruits (Figure 2). This flowering percentage is similar to a previously reported result of 50% reported for *C. vernalis* by the NSW Department of Planning, Industry and Environment in 2021.

Conversion of flowers to fruit was observed in selected plants, with an average of 81% (Figure 3). These levels would be considered high for outcrossing plants, and much higher than reported for other *Corunastylis* species (Bower *et al.* 2015; Roper 2021; Towle *et al.* 2022).

Pollinator activity

Only three individual chloropid flies were observed on three separate plants. These were photographed on three separate occasions after 40 hours of photographic observations, and none of these were seen bearing pollinia (Figure 4). The flies were not sampled due to the very low numbers sighted.

The flies were identified from photographs as a species of *Conioscinella* in the chloropid fly family, probably females as indicated by the wide faces (D. Bickel, pers. comm. 2023). Four other *Conioscinella* morphospecies were identified in pollination studies of other *Corunastylis* species (Bower *et al.* 2015; Towle *et al.* 2022; Ren *et al.* 2020).

Spider activity

Many flowers selected for photography unexpectedly showed evidence of spider presence (Figure 5). The spiders were first noticed in early November, around one week after flowering commenced, and were seen in all populations (A, B & C). The webs were difficult to perceive with the naked eye but are evident in photographs.

In more severe cases the webs were tightly bound around flowers to the extent of inhibiting opening. In other less severe cases they had the potential to impede access to flowers. In one case a spider was photographed preying on a dead fly (Figure 6). The spider was identified as *Deliochus* species, probably *D. zelivira*.

Discussion

The Vulnerable East Lynne Midge Orchid occupies very specific habitat in a narrow band on the NSW South Coast. Understanding its biology including pollinators is important to ensure its ongoing protection in a changing environment.

This work identified a potential chloropid pollinator in very low numbers, but also an unexpected potential threat in the form of a predatory spider. Spider webs were visible on many flowers, sometimes enclosing the flower, and predation of a chloropid pollinator candidate was observed. Spiders could be having an important impact on reproductive success in two ways, by:

- Preventing pollinators from accessing the flowers, and;
- Reducing the pool of pollinators through predation.



(left to right) Figure 2. *C. vernalis* – around 40% of plants flowered. Figure 3. *C. vernalis* – a high proportion of flowers developed fruit. Figure 4. A species of chloropid fly in the genus *Conioscinella* seen on flowers. Photos: Phil Warburton

The widespread presence of spiders may explain the low number of observed pollinator candidates. However fruiting levels are comparable (though slightly lower) to those reported for other *Corunastylis* species. These flowers may have been pollinated outside our observation times, or self-pollination could also be a possibility.

The 2019-20 bushfire may have indirectly precipitated an increase in spider populations, by reducing the number of parasitoid wasps that might normally keep the spiders in check. Such wasps are known to be vulnerable to fires, and numbers at the ERBG appear to be much lower since the 2019-20 fire.

The impact of bushfires generally on insects and subsequent effect on forest ecology is not well documented. Our observations indicate that impacts on pollination biology could be complex, and either direct by reducing pollinators in the first instance or indirect by disrupting predator-prey relationships affecting pollinators.

Acknowledgements

We thank Dan Bickel for identifying the chloropid fly, Jim Murray for identifying the spider, and Mark Clements and Heidi Zimmer for confirming the identity of ERBG collections of *C. vernalis*.

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Figure 5. Spider webs were seen on many racemes, sometimes inhibiting flower-opening. Photo: Phil Warburton



Figure 6. Spider predating on the chloropid fly. Photo: Rob Geraghty

Restoring Australia's vital seagrass meadows through community efforts

CHRIS BLACK

OzFish Unlimited, Ballina NSW 2470

Email: info@ozfish.org.au

The restoration of one of Australia's most important and threatened aquatic habitats is underway across the country and it is being led by what may appear, at first glance, to be an unlikely group of heroes.

Since the 1880s, it is estimated around 30 per cent of Australia's seagrass meadows have been lost. This represents hundreds of thousands of hectares of vital habitat, including across some of Australia's most important commercial and recreational fisheries. It is the role seagrass meadows have in supporting native fish numbers which has led to a community-driven restoration effort across the country.

OzFish is Australia's only recreational fishing charity and mobilises members of Australia's four-million strong recreational fishing community to undertake fish habitat restoration. Its mission is better habitat for better fishing. Whether you pick up a rod every day, each week, or once a year, you will be experiencing the benefits this approach brings to whole ecosystems and communities.

The importance of seagrass meadows

It is estimated that a hectare of seagrass will produce an average of 207 kilograms of fish per year more than an area bereft of seagrass. They are important foraging and nursery grounds for fish species, including pink snapper, whiting, blue swimmer crabs, prawns, garfish, rock flathead, squid and leafy seadragons.

In addition to their importance for fish populations, seagrass meadows also help protect coastlines from erosion and play a significant role in carbon sequestration. A hectare of seagrass can store up to 35 times more carbon than a hectare of rainforest. It does this by drawing carbon dioxide from the water as part of photosynthesis and then traps it in the mud on the ocean floor.

There are between 60 and 70 species of seagrass globally and more than half of those can be found in Australian waters, including *Posidonia australis*. Last year, scientists discovered that the world's largest plant was a single *P. australis* stretching across more than 180kms in Shark Bay, Western Australia. It is this species that is the focus of OzFish's largest current project in Cockburn Sound, Western Australia.

Community-led restoration across the nation

OzFish is engaged in seagrass restoration in six states: New South Wales, Queensland, South Australia, Tasmania, Victoria and Western Australia. The different locations and varieties of seagrass mean OzFish's restoration approach varies considering the distinct challenges posed at each location.

However, it is always championed by recreational fishing volunteers and delivered in partnership with local stakeholders and leading research institutions. Underpinning the activity across all states is the significant funding support OzFish receives from its major corporate partner: BCF – Boating, Camping, Fishing.

The key to OzFish's approach is the belief that restoration, not just protection, should be the objective. While simply preserving what remains of this vital habitat is an admirable goal, it falls short of returning previously thriving habitats and ecosystems.

Restoration approach

The significant loss of seagrass meadows has been caused by environmental change, pollution, harvesting of seagrass and coastal developments. Seagrass is a flowering plant, not a seaweed. This means that it is reliant on enough light reaching the ocean floor to enable it to grow. When river catchments are impacted by erosion and other events that introduce increased levels of mud and sediment, this has a knock-on effect on seagrass further down the system. Too much mud and sediment in the water blocks out the light and not enough of it reaches the ocean floor to allow seagrass to flourish.

Once it is gone, all that is left is bare sand which makes it harder for new seagrass to establish itself as there is little protection from storms for the seedlings. Many seeds also end up washed ashore or far out to sea, where conditions do not allow them to germinate.

Left to nature, the regeneration of seagrass meadows could take many hundreds of years, so OzFish gives it a helping hand. Or to be exact, many thousands of helping hands through its nationwide network of supporters – proving that many hands do make light work.

While it varies from location to location, the general approach OzFish takes to seagrass restoration is broadly the same, collecting seeds or displaced seedlings.

P. australis is a fruiting variety of seagrass and, generally, restoration involves volunteers gathering seagrass fruits whether it be from beaches, the ocean's surface or by diving to the seabed to collect it (Figure 1). This reduces the number of fruits that are lost to wind, tides and other wastage. The collected fruits are then matured and processed in special onshore saltwater tanks, before volunteers collect all viable seeds from them (Figure 2). Those seeds are then deployed back into the water at strategic locations picked to provide the greatest chance for the seeds to germinate and new seagrass meadows to flourish (Figure 3).

The deployment method can vary significantly, from scattering by hand in Western Australia to the more involved technique of hand sewing them into biodegradable sandbags which are then dropped into the ocean in South Australia.

Coast to coast, state by state

OzFish's longest running seagrass restoration initiative is the 'Seeds for Snapper' program which has been running in Western Australia's Cockburn Sound since 2018. It is now the largest and longest running seagrass restoration project in Australia.

The seagrass season in WA runs from approximately mid-November to mid-December, and 2022 saw OzFish achieve its biggest set of results to date. Volunteers dedicated more than 2,500 hours to the project, including through 404 dives to collect fruit, and helped to deploy more than 1.2 million seeds to Cockburn Sound.

The growing number of partners demonstrates the resonance it has with the local community – University of Western Australia, the Western Australian Government's Recreational Fishing Initiatives Fund, BCF, Recfishwest, City of Cockburn, Water Corporation, Adreno, and MMA Offshore are just some of the many partners onboard.

The success of a community-led approach to restoration is also shown in South Australia, where OzFish has doubled its number of 'Seeds for Snapper' projects in the last year. An established project along Adelaide's metropolitan coastline has been joined by one on the Fleurieu Peninsula. These rely on beachcombers and boaters, not divers, collecting fruit before the seeds are returned to the ocean in biodegradable sandbags.

In partnership with the University of Tasmania's Institute for Marine and Antarctic Studies, OzFish is delivering the state's first ever seagrass restoration trial. This seeks to define approaches and provide critical data that will enable large-scale *Zostera* seagrass restoration in Tasmania.



Figure 1. Volunteer diver netting seagrass fruit from the ocean floor. Photo: OzFish



Figure 2. An OzFisher putting harvested seagrass fruit into an onshore water tank. Photo: OzFish



Figure 3. Close-up of a seagrass seed in the hand of a community volunteer. Photo: OzFish

Proving that the desire to get involved in making things better is widespread, OzFish is also engaged in seagrass restoration activities in Corner Inlet, Victoria, where recreational and commercial fishers are joining forces to restore *Posidonia* throughout the inlet. Projects are also underway at Lake Macquarie in NSW with the Institute of Marine Science at the University of New South Wales, and in Queensland at Mourilyan Harbour in partnership with James Cook University.

Working together for success

OzFish and Australia's recreational fishers are showing that bringing like-minded people together and providing them with the support and means is an effective way to deliver habitat restoration at scale.

Motivated and engaged community members, backed by scientists and local organisations and businesses, are the backbone of a winning team when it comes to returning thriving ecosystems to Australia. It does not need to be limited to seagrass, as is shown by the breadth and depth of projects represented on the OzFish website: <https://ozfish.org.au/>

ASBP News

Kangaroo Island Rare Plant Garden

BRADLEY BIANCO*, JENNY R. GUERIN AND DANIEL J. DUVAL

South Australian Seed Conservation Centre, Botanic Gardens of South Australia

*Email: Bradley.Bianco@sa.gov.au

Following the devastating 'black summer' bushfires of 2019/2020, generous support for bush recovery was provided by the Australian Government, the United Kingdom Government, and other international and local sponsors. Grant funding co-ordinated by the Australian Seed Bank Partnership (ASBP) supported seed bank staff to undertake recovery assessments and seed collections for threatened plants species in states affected by the fires. One of the largest fires in South Australia burnt over 167,000 hectares of bushland on Kangaroo Island with 83% at high to very high severity. The South Australian Seed Conservation Centre (SASCC) commenced field work within 6 months after the fires and continued monthly visits to the island to monitor threatened plant species recovery, document post-fire recruitment strategies and collect seeds. Kangaroo Island botanists and expert volunteers assisted greatly with surveys, assessments and seed collections for priority species populations.

Significant seed collections made during these field trips included fire ephemeral species that are only seen post-fire with some not previously recorded on the island or thought to be extinct, including *Roripa gigantea* and *Chenopodium erosum*. Some endemic species, including *Zieria veronicae* subsp. *insularis*, *Achnophora tatei* and *Hydrocotyle crassiuscula* set seed in abundance in post-fire conditions allowing large conservation collections to be stored (Figure 1). Several collections were new to the seed bank including species new to the state, such as *Trithuria australis*, or not recorded on the island for over 50 years,

including *Ottelia ovalifolia* ssp. *ovalifolia*, *Nymphoides geminata* and *Sigesbeckia orientalis*. In addition, some valuable seed collections were made from swamps, lagoons and creek-lines that were only possible to access post-fire.

The fires raised awareness that declining populations of threatened plant species are highly susceptible to combinations of environmental events such as fire, extreme temperatures, drought or flooding as well as selective pressure from weeds, herbivory and clearance.



Figure 1. *Achnophora tatei* plant at Vivonne Bay, Kangaroo Island. Photo: South Australian Seed Conservation Centre

There was a clear need for sustainable, genetically diverse seed supplies that do not rely on wild harvested collection from fragile populations with few individuals. These *ex situ* collections are fundamental for on-ground recovery work such as reintroductions and the augmentation of rapidly declining populations.

The concept of the Kangaroo Island Rare Plant Garden (KIRPG) was supported by a land donation by the owners of Cygnet Park Sanctuary, funding through the ASBP from the '*Bushfire Recovery Program for Wildlife and their Habitat*', and the availability of seeds and seedlings through nearly twenty years of work on the island by the SASCC. After two community workshops (supported by the Nature Conservation Society of South Australia (NCSSA)) connecting people with rare flora on the Island, there was obviously several members within the community keen to help with the project.

The KIRPG vision is to preserve the Island's threatened and endemic flora and create a community space where members of the public can assist in worthwhile conservation projects and become familiar with the island's unique flora. Site preparation, construction of a 5000 m² herbivore exclusion fence and installation of a rainwater tank and irrigation was completed by January 2022. The area was landscaped to accommodate plants from the island's diversity of habitats – ironstone gravels for plants from lateritic soils, sands with limestone rubble for plants found on the calcareous soils of the coast and constructed 'wetlands' that hold water in ephemeral pools. The project has now become a partnership

between the SASCC and two local environmental non-government organisations – Bio^R and the NCSSA. On 9th July 2022 the KIRPG was officially opened by South Australia's Minister for Climate, Environment and Water, the Hon. Susan Close MP, in the company of dozens of community members. During the opening the first 1,500 plants comprising over 60 threatened and endemic species were planted into the landscaped beds by eager volunteers (Figure 2). Approximately one-third of the total garden area has been planted, with enormous scope for future development working with a dedicated volunteer group.

With so much interest from the Kangaroo Island community, a 'Friends of the Kangaroo Island Rare Plant Garden' has been established. With the initial plantings in the ground, the focus is now on caring for the garden, seed collection from the KIRPG for banking and propagation of plants for restoration projects on the island. There are plans for continued landscaping and planting of the remaining area within the garden and for the construction of a volunteer laboratory/workspace for cleaning, testing and storing seeds and even a gazebo. The KIRPG is situated nearby a spacious plant nursery ideal for the propagation of plants by the Friends. In the future the Friends may discover new populations of rare plants, and learn more about habitats and interactions with pollinators and other animals, and generally deepen the knowledge of the plants' natural life history. The more we know about plants, the better placed we will be to help protect them.



Figure 2. Volunteers helping out on the opening day of the Seed Production Garden, Cygnet Park Sanctuary, Kangaroo Island.
Photo: South Australian Seed Conservation Centre

ANPC Member profile

Lorraine Perrins

What is your current position?

I am employed at the Royal Tasmanian Botanical Gardens (RTBG) as Curator, Conservation Collections & Subantarctic Flora. I am based with the RTBG Nursery Team where I propagate plant species for the Gardens' Horticulturists as well as growing and maintaining plants in our Subantarctic Island Display House. A key component of my work is to maintain the RTBG conservation collections as either *ex situ* plant collections or as seed orchards for our Tasmanian Seed Conservation Centre (TSCC). Some of these seed orchards are also being monitored off-site e.g., in remote Macquarie Island (see APC 28(2) from 2019), or with volunteer groups in other regions of Tasmania.

What projects are you working on now?

I am incredibly fortunate that my work provides regular opportunities to be involved in a wide variety of horticultural and practical conservation work with a number of project partners. Some recent projects are:

- Working with the Landscape Recovery Foundation and its Native Orchid Conservation and Research Program. We have just presented a display of Critically Endangered orchids from the Tasmanian Midlands. The display used the RTBG collections to engage orchid enthusiasts in ethical photography principals, particularly when visiting threatened orchid sites, providing an opportunity to obtain good quality images without impacting wild populations. The display was very successful and another using different species was held in December 2022.
- Growing 1500 tubestock plants from seed of the critically endangered *Eucalyptus morrisbyii* (Morrisby's Gum) as part of the recovery plan for this species. This program will continue in 2023.
- Working in tandem with a native plant nursery to propagate tubestock of *Bertya tasmanica*, a threatened Tasmanian endemic, to augment wild populations on a Bush Heritage property on Tasmania's East Coast.
- Being involved in the formulation of, and some actions for, the Adaptive Management Plan for *Tetratheca gunnii* (Shy Susan).
- Having seven active seed orchards within the RTBG Nursery (see APC 29(2) from 2020), and organising the collection of propagation material for another two species.



Lorraine Perrins. Photo: Chris Fernance

How did you end up working in plant conservation?

I studied horticulture on leaving school and was lucky to gain an apprenticeship at Birmingham Botanical Gardens in the United Kingdom, undertaking the Kew Diploma in Horticulture at the Royal Botanic Gardens, Kew in London, soon after. Being exposed to the work of botanic gardens early in my career highlighted their importance as both educational and scientific institutions; it was during my studentship at Kew that the charitable organisation Botanic Gardens Conservation International (BGCI) was formed with its mission to *"mobilise botanic gardens and engage partners in securing plant diversity for the well-being of people and the planet"*. During much of the 1990's and early 2000's I worked as a horticulturist at the Royal Botanic Gardens, Sydney. Whilst there I was seconded for 18 months to work on an environmental aid program working with indigenous medical practitioners, focussing on propagating and sustainably harvesting locally significant medicinal plants in Northern Vietnam. Following this experience, I completed the Diploma of Plant Conservation Techniques at the RBG Kew. Part of this course required initiating a conservation project; I focussed on the transfer of vegetative propagation techniques and facilities to staff at Kebun Raya Botanic

Gardens, Bogor in Indonesia, assisting them to build up stocks of *Amorphophallus titanum* (the Titan Arum), which at the time was being harvested in its native Sumatra for the plant trade. A move to Tasmania in 2006 led to my work at the RTBG and coincided with the growing realisation that climate change impacts on biodiversity were already occurring, particularly in our own backyard. I feel very privileged that my role contributes (albeit in a small way) to preserving some of our plant diversity in the TSCC.

What is your favourite plant and why?

Such a difficult question! I have never had a consistent plant or group of plants which have been favourites. I tend to focus on whatever species I am responsible for at any particular time, however some of the species which I have been fortunate to work with during my career which continue to amaze me are *Welwitschia mirabilis*, such a resilient plant from the Namib Desert; the Titan Arum (*Amorphophallus titanum*) with its incredible publicity pulling power, the Hymenophyllaceae (filmy ferns) durable but delicate; and the Tasmanian endemic, *Lomatia tasmanica* for its incredible longevity against the odds.

Why do you think the ANPC network is important and what do you see are our priorities?

The ANPC is a great asset for anyone working in the plant conservation field. The Germplasm and Translocation Guidelines provide excellent templates and guidance,

and the Australasian Plant Conservation quarterly journal is a wonderful repository of information on plant conservation projects and research across the Australasian region. The way the organisation has evolved to embrace different communication mediums and reach a greater audience is to be commended. I feel the ANPC's outreach and engagement should continue to play a crucial role, particularly in regions where there are limited resources and opportunities for networking and accessing relevant information. The common perception in the public arena that plant conservation is solely about protecting threatened species needs to be challenged, as the awareness around the pace of change and range of plants and habitats which may be affected in a changing climate become apparent. I think one of the biggest challenges for ANPC into the future will be the ability to provide the plant conservation community with not only the tools to assist them to deal with the practical responses required to maintain our plant diversity, but also facilitate the provision of coping strategies and build resilience for the psychological challenges of the task ahead.

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Lorraine at Moonlight Ridge, South West National Park. Photo: Royal Tasmanian Botanical Gardens

Book review

Australia's Megafires: Biodiversity Impacts and Lessons from 2019–2020

Edited by: Libby Rumpff, Sarah Legge, Stephen van Leeuwen, Brendan Wintle, John Woinarski

Paperback | February 2023 | \$ 69.99 | ISBN: 9781486316649 | 512 pages | 245 x 170 mm

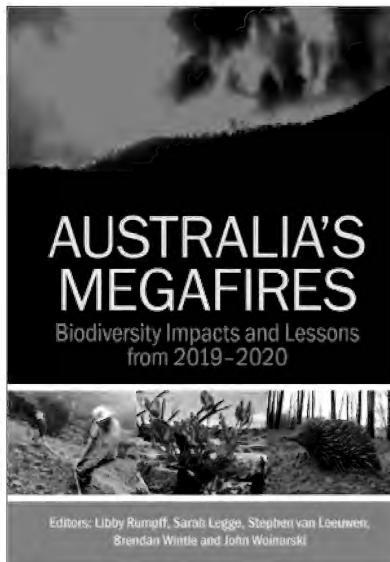
Publisher: CSIRO Publishing | B&W photographs, Colour photographs, Illustrations, Maps

Released three years after the 2019-20 Australian bushfires, 'Australia's Megafires' has drawn together a vast number of researchers and managers to review the impact of these fires on biodiversity and the various responses that were undertaken to curb those impacts.

The book starts with a plea, acting almost as a call to arms that we do not let the devastation and destruction of these fires happen again in the future. Chapter by chapter, it then begins to list the impacts and losses, littered with blue boxes, case studies of saddening consequences; declining numbers of gliders, rivers filled with sediment and the extinction of the mealybug.

As a plant ecologist, a lot of the impacts on soil, rivers and animals was unknown to me, and while reading, the feeling that there was no part of the environment these fires didn't touch grew and grew. The impacts on biodiversity are also not the only outlined, including impacts on Indigenous cultural values and world heritage sites.

However, not all these blue boxes contain devastation. Peppered with success stories, the book precariously balances between documenting the sadness of what was endured and the hope that if it happens again, we will be better prepared. This is beautifully captured in one of the last chapters – a compilation of personal reflections of grief and hope. What I found to be the greatest aspect of the book was that each of these chapters was followed by a list of recommendations, specific to the focus of the chapter. While all chapters touch on the deep need to combat climate change, recommendations were centred around managing the future of increased fire risk. Common recommendations were increasing research, promoting listing of threatened species, and developing emergency response plans.



The book then moves on to various responses by government, NGOs and natural resource management groups. Perhaps apparent by the 200 contributors to the making of this book, these sections highlight the need for collaboration, which allowed accelerated assessment, increased funding, and a spotlight on biodiversity to the general public. It is perhaps a loss then that this book may not be accessed by the public, appealing more to scientists and managers, who will find greater use from the warnings issued and the recommendations.

As expected with the book release only three years after the fires, the effectiveness of the actions taken, and the extent of recovery is not fully assessed. Perhaps a second volume will be necessary to document what actions have been effective and how these recommendations have been taken on. What impact this book has on decision making, management intervention and policy will be what is important, as it makes apparent this is not a standalone event and we can expect a future of extreme events. The facts have been laid down, the extent and impact, far and wide but action and change will be what makes the difference, and this book is one of the many steps to the future of biodiversity we long for.

By Ruby Paroissien

ANPC News and conferences

ANPC Annual General Meeting

We held our Annual General Meeting on Wednesday 16 November 2022 over Zoom and in person at the Australian National Botanic Gardens. Our president, Tony Auld, presented his President's Report which can be read at https://www.anpc.asn.au/wp-content/uploads/2022/11/Presidents-report-2022_18112022PDF.pdf

We said thank you and farewell to our committee member **Meredith Cosgrove** who has finished her term. We welcomed Leonie Monks to the ANPC Management Committee and welcomed back **Linda Broadhurst, Andrew Fairney, Melissa Millar and Singarayer Florentine** who renominated for another 2 years as Ordinary Members of the ANPC Management Committee

Dr Geoff Pegg, our guest speaker, gave an insightful talk on the results of the Fire and Rust project which looked at the impact of Myrtle Rust on post fire regeneration. You can watch his presentation at <https://www.youtube.com/watch?v=EUQUpHYhzRI>. We also had time at the conclusion of the meeting to play the new film 'Myrtle Rust - the silent killer'. https://youtu.be/377xA_FeJoA

Native Guava Project Updates

Planting out

In spring 2022, partners in our collaborative project to secure Safe Custody for Native Guava received the first plants to add to their living collections. Five advanced *Rhodomyrtus psidioides* plants were each sent from the Australian Botanic Garden Mount Annan to Lismore Rainforest Botanic Garden (NSW), the Blue Mountains Botanic Garden Mount Tomah (NSW), the Australian National Botanic Garden (ACT) and Dandenong Ranges Botanic Garden (VIC). Plants were also added to the existing collection of these species at the Australian Botanic Garden Mount Annan.



Ashleigh Poynter and Ryan Newett planting critically endangered *Rhodomyrtus psidioides* (Native Guava) at the Australian Botanic Garden Mount Annan. Photo: Michael Elgey.

Action to conserve Native Guava was rated as an emergency priority in the Myrtle Rust in Australia National Action Plan. This pilot project aims to show what is possible with collaborative action on germplasm capture. We also aim to understand the workflow and take any learnings into similar future *ex situ* conservation projects on emergency priority species. This project received grant funding from the Australian Government. <https://www.anpc.asn.au/wp-content/uploads/2020/11/Myrtle-Rust-National-Action-Plan-2020.pdf>



Dr Zoe Knapp and Toby Golson with critically endangered *Rhodomyrtus psidioides* (Native Guava) planted at the Australian National Botanic Garden. Photo: Amelia Martyn Yenson.

Germplasm capture

Conservation of plant species in their existing habitat is critical, but for species in rapid decline such as Native Guava, *ex situ* conservation (away from the natural habitat) may be the only way to safely preserve genetic variation. Our current collaborative project on Native Guava helps meet the objective of Germplasm Capture, which is a very high priority in the Myrtle Rust in Australia National Action Plan. Without germplasm capture, there are no future options for species preservation or recovery.

For species undergoing significant decline, germplasm capture is urgently required to secure insurance collections of these species before genetic diversity is lost.

Monitoring and sampling are ongoing over the range of Native Guava, and this project funded by the Australian Government has supported sampling and genetic analysis in both Queensland and NSW. Where possible, cuttings are also taken to establish *ex situ* populations at the Department of Agriculture and Forestry (Qld) nursery in Gympie and add to the *ex situ* collection at the Australian Botanic Garden Mount Annan (NSW).



Dead Native Guava trees at Simpson Falls, Brisbane, September 2022. Photo: Geoff Pegg



Germplasm sampling of Native Guava (*Rhodomyrtus psidioides*). Photo: Craig Stehn

Propagation

While seed is the easiest and most efficient form of germplasm to store, species such as Native Guava (*Rhodomyrtus psidioides*) are undergoing such significant decline due to Myrtle Rust that they no longer produce viable seeds for collection. Other species have seeds that are not suited to storage under conventional seedbanking conditions. For these species, cutting propagation is a way of capturing genetic diversity and establishing *ex situ* collections that provide a measure of insurance against extinction.

Our partners at the Department of Agriculture and Forestry (Qld) and the Australian Botanic Garden Mount Annan (NSW) are establishing new *ex situ* collections from wild-collected germplasm. These collections provide a source of future propagation material, an accessible collection for research and a way of distributing germplasm across partner organisations as a further measure to establish the species in safe custody. This project received grant funding from the Australian Government.



Cutting propagation of Native Guava (*Rhodomyrtus psidioides*) at the Australian Botanic Garden Mount Annan. Photo: Amelia Martyn Yenson

ANPC Donation Drive – Will you help us in the fight against Myrtle Rust?

We are raising funds for our work on Myrtle Rust which infects hundreds of species in the Myrtaceae family, including our bottlebrushes, paperbarks, lilly pillies, and eucalypts. Since this disease was introduced to Australia in 2010, five native plants have jumped straight to the 'Critically Endangered' category as a direct result of the disease, and are faced with extinction in the wild in the very near future. A further 20–30 Australian native species are known, or suspected, to also be in decline, and over 300 more are known to be susceptible to a lesser degree. This number will rise.

We are raising funds to:

- Further develop the Myrtle Rust information hub on our website to provide even more up-to-date, scientifically accurate information and images of the disease and the species affected by it.
- Continue to identify relevant global research and information and bring this to the heart of decision making about Myrtle Rust in Australia.
- Share our evidence-based resources with the wider conservation community.
- Continue to work across the silos that divide the people and resources needed for an integrated national response to the disease.
- Promote the *National Action Plan for Myrtle Rust*, and lobby for the new resources that will be needed by botanic gardens and agencies to implement it.
- Promote improved environmental biosecurity measures for this and future environmental plant diseases.

Please help us take our fight against Myrtle Rust to the next level and donate now at

<https://www.anpc.asn.au/myrtle-rust/donationform/>
Our Myrtle Rust team are happy to discuss our work with prospective donors. Please contact us at myrtlerust@anpc.asn.au



Dead Native Guava trees at Bongil Bongil National Park, NSW, 2013, only three years after the arrival of Myrtle Rust. In recent surveys in NSW and QLD, no adult trees remain of this once common rainforest plant. Photo: Peter Entwistle

Film Release: Myrtle Rust – the silent killer

A new film shares first-hand stories on Myrtle Rust from indigenous rangers, scientists and landowners. Learn how our precious species and landscapes are under threat and the conservation actions we can take to save them.

This film was a collaborative project led by Queensland Department of Agriculture and Fisheries with support from the Australian Network for Plant Conservation, San Diego Zoo Wildlife Alliance, NSW Government, Butchulla Aboriginal Corporation, and the Plant Biosecurity Science Foundation.

https://www.youtube.com/watch?v=377xA_FeJoA&feature=youtu.be

ESA-SCBO 2022

ANPC Committee Members and Project Managers attended the conference of the Ecological Society of Australia and the Society for Conservation Biology Oceania. This event was held in Wollongong from 28 November to 2 December 2022. President Tony Auld's presentation was on 'Understanding fire impacts on plants'. Amelia Martyn Yenson and Chantelle Doyle spoke during the Emotions in Ecology symposium (which Chantelle helped to convene).

Regroup on Revegetation

In December a Regroup on Revegetation workshop was held in Wagga Wagga by the Holbrook Landcare Network. Over 75 people attended and discussed the future of revegetation on farms. One of the key outcomes was to press for the reprint of the Regional Vegetation Guide Profiles with updates on-line and possible inclusion and linking with the NSW Trees Near Me App. These Guides currently cover the entire Murray/ Riverina/ Murrumbidgee catchments and LLS regions. This was also one of the key recommendations from the Healthy Seeds Roadmap that every LLS NRM region have current online Vegetation Guides and profiles, and there be state-wide integration and coordination of these templates and databases for all restoration planning and works.

<https://holbrooklandcare.org.au/regroup-on-revegetation/>



Grandfathers and Senior Elders of Revez in the Riverina – Dick Green, Ian Davidson and Martin Driver with Kylie Durant, Holbrook Landcare. Photo: Martin Driver

Plant Cuttings

Editor's note: News excerpts are clipped from a diversity of sources. To read the articles in full follow the links attached to each clipping. The views expressed in these articles are those of their authors and do not necessarily represent the opinion of the ANPC.

Researchers discover new plant species in the heart of Sydney – Royal Botanic Garden Sydney, 3 November 2022

A new sword sedge species that was right under the noses of Joseph Banks and Daniel Solander has been discovered in the heart of Sydney. Sword sedges hold many important uses for Indigenous people, including making fishing lines, fish traps and baskets.

<https://www.rbgsyd.nsw.gov.au/stories/2022/researchers-discover-new-plant-species-in-the-heart-of-sydney>

Connect the Plot – Gardening Australia, 4 November 2022

Millie is in Central Victoria, along the Campaspe River, to meet Dr Sophie Bickford, a conservation ecologist who has been working with Biolinks Alliance. This work aims to create large-scale connections of conservation areas (or 'biolinks') across different tenures of landowner throughout Victoria.

<https://www.abc.net.au/gardening/how-to/connect-the-plot/101611936>

How plants made the world and can save it – ABC Radio National, 7 November 2022

We're trying to increase green space in the urban jungle by planting on walls, rooftops, verges, in parks and community gardens. And not just because plants are pretty to look at.

They're vital for our survival from the air we breathe, to the food we eat, to keeping us cool and they help offset carbon emissions.

<https://www.abc.net.au/radionationナル/programs/bigideas/how-plants-made-the-world-and-can-save-it/101612928>

Reports of alligator weed in Menindee Lakes system debunked after Western Local Land Services probe – ABC, 9 November 2022

Members of the Menindee community and the Western Local Land Services (LLS) have officially put reports of the noxious alligator weed in the Menindee Lake system to bed.

<https://www.abc.net.au/news/2022-11-09/alligator-weed-reports-in-menindee-lakes-system-debunked/101631026>

Seeds of hope for Banksia restoration projects – Royal Botanic Garden Sydney, 9 November 2022

New research into the impacts of fungi growing inside *Banksia* seeds could lead to better ways of restoring this iconic Australian native plant back into nature. Allison Merton, from the Research Centre for Ecosystem Resilience at the Australian Institute of Botanical Science, said her pioneering study, published in *Fungal Biology*, revealed fresh insights into how *Banksia* seeds functioned.

<https://www.rbgsyd.nsw.gov.au/stories/2022/seeds-of-hope-for-banksia-restoration-projects>

With orchids and carnivorous plants abloom in Tasmania's forests, it's a risky time of year for insects – ABC Radio Hobart, 13 November 2022

Slowly walking along a track in bushland just outside Hobart, Aimee Bliss searches the edge of a dry forest for some of Tasmania's most fascinating plants. This time of year, many of the state's orchids and carnivorous plants are out in full force.

<https://www.abc.net.au/news/2022-11-13/orchids-and-carnivorous-plants-bloom-in-tasmanian-forests/101636732>

The vanishing old-growth forest - ABC, 13 November 2022

On November 7, 2019 — a year after an election that saw the Greens threatening to scoop some progressive seats off Labor — Victorian Premier Daniel Andrews made an announcement his government described as "the largest environmental protection policy in the state's history". In a little over 10 years, the logging of native forests in the state would end.

<https://www.abc.net.au/news/2022-11-13/our-vanishing-old-growth-forests/101641964>

The society keeping track of Canberra's orchids – ABC Canberra, 14 November 2022

Have you hiked Black Mountain and noticed vibrant flowers peaking through the trees? Canberra's Black Mountain is home to over 70 types of orchids. Although vibrant, cataloguing these plants is a challenge.

<https://www.abc.net.au/canberra/programs/afternoons/the-society-keeping-track-of-canberra-s-orchids/101652386>

New booklet showcases island's natural wonders – ABC North Queensland, 17 November 2022

Arcadia Coastcare has released its new booklet "Some Native Plants of Arcadia, Magnetic Island (Yunbenun). The work showcases the knowledge and research of nine local authors, letting nature lovers know about particular plants in the Arcadia region, as well as the insects they attract.

<https://www.abc.net.au/northqld/programs/breakfast/maggie-island-plants/101664442>

Tree hunter Alistair Watt nurtures rare plants in his garden in Victoria's Otway Ranges – ABC, 20 November 2022

Alistair Watt's induction into an exclusive, invite-only club of tree collectors happened by accident. He jokingly downplays his obsession with rare trees as akin to a very large and cumbersome stamp collection. But his determination to hunt down and introduce new species to his garden (and Australia) also has a worthy purpose.

<https://www.abc.net.au/news/2022-11-20/gardens-trees-otways-rare-collection-royal-botanic-gardens/101499128>

BGCI Accreditation

The Royal Botanic Gardens and Domain Trust have been granted Botanic Garden Accreditation from BGCI. Visit the BGCI website to learn more about the accreditation standards.

<https://www.bgci.org/our-work/sharing-knowledge-and-resources/bgci-accreditation-scheme/about-the-bgci-accreditation-scheme/accreditation-standards/>

For self-proclaimed 'gum nuts' this is eucalyptus heaven – Sydney Morning Herald, 11 November 2022

There are 1013 known species of eucalypt. Dean Nicolle has planted 980 of them. This incredible collection of gum diversity is at the Currency Creek Arboretum, which sits between the wine-growing regions of McLaren Vale and Langhorne Creek in South Australia. Nicolle, a eucalypt botanist, arborist and ecologist, and his partner Annett Boerner, who is a geoecologist and scientific publications specialist, maintain the arboretum themselves and open it to the public a couple of times a year.

<https://www.smh.com.au/lifestyle/life-and-relationships/for-self-proclaimed-gum-nuts-this-is-eucalyptus-heaven-20221110-p5bx6x.html>

Kimberley pastoralists first in line for government land degradation overhaul – ABC News, 30 November 2022

Pastoralists and farmers from across Western Australia will soon have to comply with tightened land management standards as the state government boosts efforts to reverse degradation. The Department of Primary Industries and Regional Development (DPIRD) is leading an overhaul of the current lands monitoring and assessment system.

<https://www.abc.net.au/news/2022-11-30/new-lands-standards-flagged-for-kimberley-pastoralists-farmers/101711996>

Saltmarsh and seagrass are nature's storm protectors, safeguarding thousands of Aussie homes – ABC, 7 December 2022

Scientists have discovered the vital role that saltmarsh and seagrass ecosystems have in protecting thousands of homes from potential storm surge damage. The Australian Bureau of Statistics (ABS) research showed saltmarsh — the intertidal zone between land and sea — protected more than 88,000 homes from potential storm surge damage in 2021.

<https://www.abc.net.au/news/2022-12-07/saltmarsh-seagrass-protecting-australian-homes-climate-change/101744790>

Illegal poppy seeds pulled from Royal Tasmanian Botanical Gardens' gift shop – ABC, 8 December 2022

The Royal Tasmanian Botanical Gardens (RTBG) has pulled seeds for growing poppies used in the production of heavy-duty painkillers from its shop after realising it was selling a prohibited product.

<https://www.abc.net.au/news/rural/2022-12-08/illegal-poppy-seeds-royal-tasmanian-botanical-gardens/101744128>

How daredevil drones find nearly extinct plants hiding in cliffs – Reuters, 10 December 2022

Dec 10 (Reuters) - Ben Nyberg stood on a knife-edge ridge along Hawaii's Na Pali Coast, his eyes scouring the leafy recesses of the neighboring red-rock ridges. It was quiet, if not for a faint buzzing of a drone flying among flocks of curious white-tailed tropicbirds.

Nyberg steered the drone closer toward the opposing ridge, scanning the iPad in his hands, which acted as a viewfinder. Then, he saw it: *Wilkesia hobdyi*.

<https://www.reuters.com/business/environment/how-daredevil-drones-find-nearly-extinct-plants-hiding-cliffs-2022-12-10/>

Keeping an eye on native plants to collect and store seeds for re-vegetation in the future – ABC, 13 December 2022

Establishing or re-establishing native vegetation in a changing climate can be very challenging, so direct seeding can be more efficient than natural growth - and to do that you need seeds. Seed spotter Tash Lappin from Murray Local Land Services spoke with Alice Walker about the work they do in seed collection, seed storage, direct seeding, and the planning and implementation of revegetation activities in her region.

https://www.abc.net.au/radio/programs/vic-statewide-mornings/seed-spotter/101766088?utm_content=twitter&utm_medium=content_shared

Why plants matter - Reuters

Reuters have put together an interesting website where you scroll through a story and statistics on why plants matter. Check it out here.

<https://www.reuters.com/graphics/GLOBAL-ENVIRONMENT/PLANTS/jnpwygywpw/index.html>

Shifting cultures – saving our species, ABC RN, 25 April 2022

Australia is famous for its unique wildlife and landscapes but we also have the highest mammal extinction rate in the world, and there are big declines in frogs, reptiles, and birds caused by introduced predators and land clearing. Some species are hanging on in small numbers on private land. Could paying farmers and Indigenous landowners to return parts of their properties to nature or turn them into carbon farms help solve our biodiversity crisis?

<https://www.abc.net.au/radiонаtional/programs/earshot/saving-our-species/13809204>

Scientists tackle rusty plant threat – The University of Queensland, 19 December 2022

University of Queensland scientists have developed an environmentally friendly RNA-based spray to help combat myrtle rust, which has wiped out many Australian plants.

<https://www.uq.edu.au/news/node/133861>

Unusual bush tomato with ladder-like features discovered in Northern Territory national park – ABC Alice Springs, 8 January 2023

During a nature walk along one of the Northern Territory's most spectacular lookouts, botanist Peter Jobson and his companions were stopped in their tracks by an unusual looking plant. The bush tomato was low-growing, and had dozens of unique right-angle spines below each flower.

<https://www.abc.net.au/news/2023-01-08/bush-tomato-species-discovered-nt-national-park/101806166>

Foul-smelling corpse flower in bloom in Adelaide – ABC, 9 January 2023

Plant-lovers are flocking to the Adelaide Botanic Gardens to see a corpse flower, which blooms once every ten years. The flower is endangered in its native Sumatra, so programs like this can help ensure its survival.

<https://www.abc.net.au/radio/programs/pm/foul-smelling-corpse-flower-in-bloom-in-adelaide/101838792>

Turning a blind eye – Roxanne Fitzgerald and Hannah Meagher, 11 January 2023

Hundreds of kilometres from regulatory eyes, out of sight and scrutiny, environmentalists claim the Northern Territory is the perfect hotbed for cowboy antics. Now it's feared one of the last untouched tropical savannas and unimpacted river networks in the world is at risk.

<https://www.abc.net.au/news/2023-01-11/land-cleared-for-cotton-farming-northern-territory/101651092>

VIDEO: Visitors to Canberra's botanic gardens return to pre-pandemic levels – ABC, 12 January 2023

The National Botanic Gardens in Canberra saw half-a-million visitors last year and is set to add to its native tropical plants collection in 2023.

<https://www.abc.net.au/news/2023-01-12/visitors-to-canberras-botanic-gardens-back-to-normal/101847504>

Jaya Hunn uses passion for plant and animal conservation to win 2022 Landcare Junior photography competition – ABC, 15 January 2023

Jaya Hunn was at home sick when he learned his picture of a sundew plant had won a national photography competition hosted by Landcare Australia. The 11-year-old Canberra boy's passion for conservation and plant life was recognised for the image of the plant glistening with dew at Umbagong District Park in Canberra's north. <https://www.abc.net.au/news/2023-01-15/act-jaya-hunn-sundew-plant-photo-contest-landcare/101855696>

One million seagrass seeds deployed in Cockburn Sound – Fishing World, 15 December 2022

Recreational fishers, volunteer divers and boaters, school students, and local businesses have come together to deploy one million seagrass seeds in one of Australia's biggest conservation initiatives.

<https://www.fishingworld.com.au/news/one-million-seagrass-seeds-deployed-in-cockburn-sound>

Orchid species added to IUCN list

Dr Heidi Zimmer led a project which sought to add 23 threatened orchid species to the IUCN Red List of Threatened Species. Dr Zimmer said, "The addition of these 23 species brings the total number of threatened Australian orchids on the IUCN Red List to 51. All but one of the 23 species are terrestrial, or ground-dwelling, species. This reflects the diversity of terrestrial orchid species in Australia. Most of the world's orchids are epiphytic, or tree-dwelling, species." Read more about this project at the CSIRO website:

<https://blog.csiro.au/rare-orchids-added-to-red-list/>

Events and opportunities

US Rare Plant Academy Videos

Explore the Rare Plant Academy video library for the latest lessons in plant conservation research, technologies, and best practices created by our network of Participating Institutions and rare plant experts.

<https://saveplants.org/cpc-rare-plant-academy/videos/>

The legacy Symposium

The recording of The Legacy Symposium with Dr Judy West held on 18 November 2022 is now available at <https://csiro.webex.com/recordingservice/sites/csiro/recording/00acc9bf4930103ba9fb005056816ffe/playback>

New Biodiversity Council

The Biodiversity Council has been formed to advocate for biodiversity and foster recognition of the biodiversity crisis. To learn more about them and subscribe to their newsletter visit <https://biodiversitycouncil.org.au/>

International Association for Vegetation Science 65th Annual Symposium

The annual symposium for the International Association for Vegetation Science (IAVS) is being held in Coffs Harbour, NSW from 4-8 September. Early bird registration closes June 15, 2023

<https://iavsaustralia2023.com/program/>

NSW Weeds Conference

The NSW Weeds Conference will be held in Dubbo, NSW from 7-10 August 2023. It will showcase the latest research and ideas for managing the establishment, impact and spread of weeds.

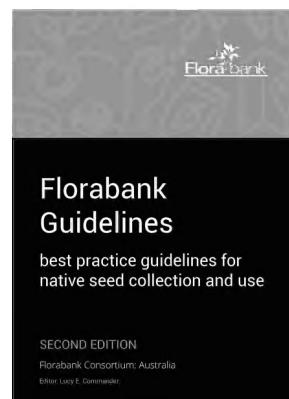
<https://www.nswweedsconf.org.au/>

Florabank Guidelines best practice guidelines for native seed collection and use

Second Edition 2021 | Editor: Lucy E. Commander
Florabank Consortium: Australia.

The second edition updates the original Guidelines, incorporating new information generated by a further 20 years of research and practice.

For more information and to order, go to www.anpc.asn.au/florabank/



Research roundup

COMPILED BY RUBY PAROISSIEN

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ANPC Corporate Members

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Centre for Australian National Biodiversity Research, ACT

Department of Biodiversity, Conservation and Attractions, WA

Department of Planning, Industry and Environment, Saving Our Species, NSW

Environment, Planning and Sustainable Development Directorate, ACT

Gladstone Tondoon Botanic Gardens, QLD

Naturelinks, VIC

Department of Environment and Science, QLD

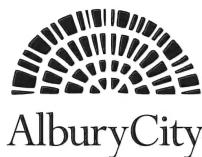
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Dead Native Guava trees at Bongil Bongil National Park, NSW, only 2 years after the arrival of Myrtle Rust.
Credit Peter Entwistle

ANPC Donation Drive

Will you help us in the fight against Myrtle Rust?

We are raising funds for our work on Myrtle Rust

Hundreds of plants species in the family Myrtaceae, including our bottlebrushes and paperbarks are vulnerable to infection by Myrtle Rust. This invasive fungal disease has caused five native plant species to jump straight to the 'Critically Endangered' category since it was introduced to Australia in 2010.

A further 20 to 30 Australian native species are known, or suspected, to be in decline. Over 300 more are susceptible to a lesser degree. This number will rise.

We need to take our fight against Myrtle Rust to the next level.

The Australian Network for Plant Conservation is raising funds to:

- **Further develop the Myrtle Rust information hub** on our website to provide even more up-to-date, scientifically accurate information and images of the disease and the species affected by it.
- Continue to **identify relevant global research and information** and bring this to the heart of decision making about Myrtle Rust in Australia.
- **Share our evidence-based resources** with the wider conservation community.
- Continue to **work across the silos that divide** the people and resources needed for an integrated national response to the disease.
- **Promote the National Action Plan for Myrtle Rust**, and lobby for the new resources that will be needed by botanic gardens and agencies to implement it.
- **Promote improved environmental biosecurity measures** for this and future environmental plant diseases.

Our Myrtle Rust team are happy to discuss our work with prospective donors.
Please contact us at myrtlerust@anpc.asn.au

PLEASE DONATE NOW:

<https://www.anpc.asn.au/myrtle-rust/donationform/>